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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,711	08/01/2000	Bjorn Markus Jakobsson	3037-4196	7518

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EXAMINER

MOORTHY, ARAVIND K

ART UNIT	PAPER NUMBER
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2131

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/630,711

Applicant(s)

JAKOBSSON ET AL.

Examiner

Aravind K Moorthy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-28 are pending in the application.
2. Claims 1-28 have been rejected.

Response to Amendment

3. The examiner approves the new abstract. The new abstract does not exceed the 150-word limit.

Response to Arguments

4. Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Page et al U.S. Patent No. 6,212,549 B1.

As to claim 1, Page et al discloses distributing a task among a plurality of entities [column 6, lines 21-32]. Page et al discloses receiving a POW relating to the task from one of the plurality of entities. Page et al discloses using the POW to accomplish the task [column 6, lines 33-46].

As to claim 2, Page et al discloses using the POW to accomplish a security goal [column 9 line 65 to column 10 line 11].

As to claim 3, Page et al discloses distributing the task among a plurality of entities includes partitioning the task into a plurality of sub-tasks and distributing each one of the plurality of sub-tasks to a respective one of the plurality of entities [column 6, lines 21-32].

As to claim 4, Page et al discloses that the security goal involves restricting resource access by the one of the plurality of entities [column 9 line 65 to column 10 line 11].

6. Claims 5-7, 12-15, 17 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Zweben et al U.S. Patent No. 5,768,586.

As to claims 5 and 13, Zweben et al discloses partitioning a minting operation into a plurality of sub-tasks [column 5, lines 20-49]. Zweben et al discloses distributing one of the plurality of sub-tasks to one of a plurality of entities [column 5, lines 20-49]. Zweben et al discloses receiving a POW from the one of the plurality of entities. Zweben et al discloses using the POW to accomplish the minting operation [column 5, lines 20-49].

As to claims 6 and 14, Zweben et al discloses using the POW to accomplish a security goal [column 6, lines 8-26].

As to claims 7, 12 and 15, Zweben et al discloses that the minting operation includes identifying valid solutions that hash to a predetermined image. Zweben et al discloses that the POW represents a valid solution [column 21, lines 32-48].

As to claim 17, Zweben et al discloses that the predetermined number of valid solutions hash to a portion of the target value [column 21, lines 32-48].

As to claim 23, Zweben et al discloses verifying the POW [column 6, lines 8-26].

7. Claims 24-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Frankel et al U.S. Patent No. 6,237,097 B1.

As to claim 24, Frankel et al discloses a method of using a computational effort invested in a proof of work (POW), comprising:

generating a computational task for a certain amount of intense computation in a specified period of time as a POW to accomplish a separate, useful and verifiable correct computation [column 10, lines 38-48];

distributing the computational task for execution among a plurality of server entities receiving a POW relating to said task from one of said plurality of said server entities [column 10 lines 49-67]; and

using said POW to verify and accomplish said computational task [column 10 lines 49-67].

As to claim 25, Frankel et al discloses that the proof of work POW is (w, p) hard if prover P with memory resources bounded by m performs an average, over l coin flips by P and V , of at most w steps of computation in the time interval $[t_s, t_c]$, and the verifier V accepts the

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probability at most $p+o(m/\text{poly}(l))$, where l is a security parameter; t_s is start time and t_c is complete time [column 12 line 51 to column 13 line 29].

As to claim 26, Frankel et al discloses that a proof of work POW is (w,p,m) feasible if there exists a prover P with memory resources bounded by m such that with an average of w steps of computation in the time interval $[t_s, t_c]$, the prover can cause the verifier V to accept with probability at least p [column 13 line 60 to column 14 line 19].

As to claim 27, Frankel et al discloses that a proof of work POW is sound, if, for some w , POW is $(w,l,\text{poly}(l))$ feasible, where l is a security parameter [column 13 line 60 to column 14 line 19].

As to claim 28, Frankel et al discloses that a POW may be regarded as efficient if the verifier performs substantially less computation than the prover [column 14 line 37 to column 15 line 22].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 8, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zweben et al U.S. Patent No. 5,768,586 as applied to claim 5 above, and further in view of Van Hook et al U.S. Patent No. 6,549,210 B1.

As to claims 8 and 9, Zweben et al does not teach that the predetermined image comprises a range of images. Zweben et al does not teach that all images within the range of images have a predetermined number of least significant bits in common.

Van Hook et al teaches hashing that has predetermined image that comprises a range of images [column 9, lines 56-67]. Van Hook et al teaches that all images within the range of images have a predetermined number of least significant bits in common [column 11, lines 13-25].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al so that the hashing would have had a predetermined image that comprises a range of images. All images within the range of images would have had a predetermined number of least significant bits in common.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al, as discussed above, by the teaching of Van Hook et al because it reduces the likelihood that adjacent addresses will map to the same cache regions. The hashing process is optimized to be sensitive to small changes in the input data so that similar sets of input data will preferably not result in the same or even similar output data [column 7, lines 15-28].

As to claim 11, Zweben et al teaches that the security goal involves restricting resource access [column 6, lines 8-26].

9. Claims 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zweben et al U.S. Patent No. 5,768,586 as applied to claims 5 and 13 above, and further in view of Xiao U.S. Patent No. 6,662,167 B1.

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As to claim 10, Zweben et al does not teach that each of the sub-tasks comprises searching a different solution search space for valid solutions.

Xiao teaches sub-tasks comprising searching a different solution search space for valid solutions [column 2, lines 26-53].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al so that each of the sub-tasks would have comprises searching a different solution search space for valid solutions.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al, as discussed above, by the teaching of Xiao because it produces a near-optimal or optimal sequence of products for manufacture [column 1, lines 13-17]

10. Claims 16 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zweben et al U.S. Patent No. 5,768,586 as applied to claim 13 above, and further in view of Simon U.S. Patent No. 5,768,385.

As to claims 16 and 19-21, Zweben et al does not teach that the privacy is maintained in the minting operation by keying the hash function with a secret value. Zweben et al does not teach that the secret value includes a portion specific to a coin. Zweben et al does not teach that the secret value includes a portion specific to a period of the coin's validity.

Simon teaches that the privacy is maintained in a minting operation by keying the hash function with a secret value. Simon teaches that a secret value includes a portion specific to a coin [column 8 line 65 to column 9 line 15]. Simon teaches that a secret value includes a portion specific to a period of the coin's validity [column 9 line 61 to column 10 line 2].

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Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al so that privacy was maintained in a minting operation by keying the hash function with a secret value. The secret value would have included a portion specific to a coin. The secret value would have included a portion specific to a period of the coin's validity.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al, as discussed above, by the teaching of Simon because it combines the features of physical cash (privacy, anonymity, unforgeability) with the best features of electronic commerce (speed, ease and potential security of transport and storage) [column 1, lines 6-31].

11. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zweben et al U.S. Patent No. 5,768,586 as applied to claim 13 above, and further in view of Puhl et al U.S. Patent No. 5,768,385.

As to claim 22, Zweben et al does not teach that the hash is of a concatenation of a solution and a value generated using the secret value.

Puhl et al teaches hashing a concatenation of a solution and a value generated using the secret value [column 17, lines 24-42].

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al so that a concatenation of a solution and a value generated using the secret value would have been hashed.

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It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Zweben et al, as discussed above, by the teaching of Simon because it thwarts theft of services and cloning [column 1, lines 24-31].

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aravind K Moorthy whose telephone number is 571-272-3793. The examiner can normally be reached on Monday-Friday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R Sheikh can be reached on 571-272-3795. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Aravind K Moorthy
January 25, 2005



Guy J. Laman
Primary Examiner